

REMARKS

The Examiner has objected to paragraph 0055 of the specification. It is believed that the error referred to was corrected in the previous amendment. If this is in error, it is requested that the Examiner telephone the undersigned and the appropriate correction will be made or authorized.

The Examiner has rejected claim 1-5 and 8-10 under 35 U.S.C. §103(a) as being unpatentable over Moslehi et al U.S. Patent No. 6,471,830 in view of Tanaka et al. U.S. Patent No. 6,210,539 and Usui U.S. Patent No. 5,513,765. The rejection is respectfully traversed, for the reasons stated below.

The rejection combines elements from three references to produce the combination of independent claim 1 and dependent claims. The combination is, however, deficient.

Regarding claim 1, none of the references discloses a peripheral ionization source that is mounted on the periphery of the substrate support. Therefore, no *prima face* case of the obviousness of claim 1 is established by the references.

Other elements of claim 1 are disclosed in one or two, but not all, of the references, with no teaching of how to combine them. To produce the claimed combination of claim 1, one or more of the references would have to be modified in a way that alters its function in a way inconsistent with the teachings of the reference. Further, there are no teachings in any of the references as to how to modify the references to produce the claimed invention. Rather, the references teach away from such modifications because they would defeat their objectives.

For example, Tanaka considers the equipotential lines shown in Fig. 5 to be of importance. In Tanaka, the equipotential lines result from the separate ground connections of the coil and substrate support. Yet, by connecting the coil and substrate support in series, as does Usui, it is inherent that a potential gradient would be produced along the series circuit, which is inconsistent with maintaining equal potential on the support and coil. This teaches away from combining Tanaka with Usui.

Each of the references, considered alone, has deficiencies greater than those noted in the rejection. As stated above, none has an ionization source mounted on the periphery of the substrate support. This is necessary in the present invention to confine the inductively coupled

plasma at the periphery to join with the capacitively coupled plasma proximate the substrate to disperse evenly over the substrate. In addition:

Moslehi lacks a a series RF circuit that includes the substrate support surface and the ionization source. Moslehi also lacks an ionization source coupled to the substrate support or that lies in the plane of the substrate support. Moslehi further has no RF circuit (series or otherwise) that biases the substrate support surface to capacitively couple to a plasma proximate the substrate support surface.

Tanaka, like Moslehi, lacks a series RF circuit that includes a substrate support surface and an ionization source. Tanaka also lacks an ionization source coupled to the substrate support. Tanaka further lacks RF generator coupled into a series circuit and an RF generator coupling RF energy to the RF circuit (series or otherwise) to bias the substrate support surface or to couple a plasma proximate the substrate support surface.

Usui, while the only reference to disclose a support coupled to a coil and connected to form a series circuit, still fails to disclose an ionization source mounted on the periphery of the substrate support. As Figs. 1 and 2 of the present application illustrate, a dense plasma 15 is energized by both capacitive coupling of energy from the planar support as well as inductive coupling from the peripheral ionization source. The physical mounting of one to the other forms a barrier that confines the plasma so that plasma from the peripheral ionization source can flow across the surface of a substrate mounted on the support.

None of the references has a peripheral ionization source coupled to and surrounding the substrate support in the plane of the substrate support, and mounted on the periphery of the substrate support. The present application illustrates and describes how the dense plasma is formed and distributes over the wafer on the support, which the references do not suggest.

For the reasons stated above, claim 1 is patentable. For the same reasons, all dependent claims are patentable.

There are other reasons why each of the dependent claims is patentable. For example, Claim 4 recites that the series RF circuit that includes the substrate support surface and the peripheral ionization source has the surface and the antenna capacitively coupled together to form the series circuit. This refers to, for example, the elements 24 and 25 in Figs. 3A-3F, 4B and 4D.

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Only the Usui reference discloses a series circuit, but it shows the elements to be electrically connected in series, not capacitively coupled, as claimed in claim 4.

Other dependent claims are rejected over the above discussed references in further view of one or more of the U.S. Patents to Denda et al., U.S. Patent No. 6,440,260; Dible et al, U.S. Patent No. 6,042,686; Liu et al, U.S. Patent App. Pub. No. 2002/0027205; Pu et al., U.S. Patent No. 6,825,618; and Hanawa, U.S. Patent No. 6,027,601. None of these references provides the motivation to combine references that is lacking among Moslehi, Tanaka and Usui, discussed above.

Regarding the provisional double patenting rejection over the applicant's copending application serial no. 10/717,268 and applicant's previous offer of a terminal disclaimer, that application is currently finally rejected. Accordingly, there is presently no double patenting regarding the present application. Should the cited application proceed further, any double patenting issues that arise will be dealt with in the prosecution of the cited application.

For the reasons stated above, it is submitted that the claims are patentable, and accordingly, early allowance is respectfully requested.

Respectfully submitted,

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